

A Triassic fossil of scorpion fly from Mine, Japan

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Abstract A new species of the extinct mecopterous genus *Orthophlebia* WESTWOOD is described from Okuhata, Mine City, Japan, the Upper Triassic. It is the first record of the genus from Japan.

Introduction

From the autumn of 1987 to the spring of 1990, the Momonoki Formation encountered in a new road construction (route 435) and yielded many insect and plant fossils at Okuhata, Mine City, Yamaguchi Pref., western end of Honshu, Japan. This research was mainly done by the staffs of Mine City Museum of History and Folklore (MMHF) and the members of Mine Natural History Society. Mr. Takayoshi HARADA, who is a member of the Mine Natural History Society and also one of the chief members of Kitakyushu Natural History Society, found this interesting fossil insect in the field research. He kindly donated it to Kitakyushu Museum of Natural History (KMNH) and gave me the opportunity to study it. Before going further I would like to express my hearty thanks to Mr. T. HARADA for his kindness above mentioned. Dr. Masamichi OTA, director of KMNH and Mr. J. AIZAWA, Fukuoka University made the detailed geological map of this district, and gave me many comments on this manuscript. Professor T. SAIGUSA, Kyushu University read this manuscript and gave critical comments. Dr. D. SCHLEE, Stuttgart Museum für Naturkunde, Dr. R. WILLMANN, Universität Kiel gave me some important information about the species and literatures. I am indebted to Dr. I. FUJIYAMA, Tokyo, Messrs. A. FUJII, Y. OKAZAKI and Y. YABUMOTO, KMNH for their useful comments on geological and palaeontological problems. Messrs. F. TAKAHASHI and H. ISHIDA of MMHF, and E. DOI, Asa kindly helped us during the field work in many ways. Dr. S. ASAHINA, Tokyo kindly lent me his valuable literatures for references. The staffs of the library of the Natural History Museum, London and Miss C. PEPERMANS, the librarian of Nationaal Natuurhistorisch Museum, Leiden helped me to cite important literatures. Dr. T. SHIRÔZU of KMNH encouraged me during the study.

Geology

The locality of this fossil insect is at Okuhata in Mine City (Fig. 1), and it belongs to the Momonoki Formation, Mine Group, Carnian, Upper Triassic (FUJIYAMA, 1973 etc.). A columnar section of Momonoki Formation at the Okuhata was examined by Dr. M. OTA, Messrs. T. HARADA and J. AIZAWA, and is shown in fig. 2 (AIZAWA, 1991).

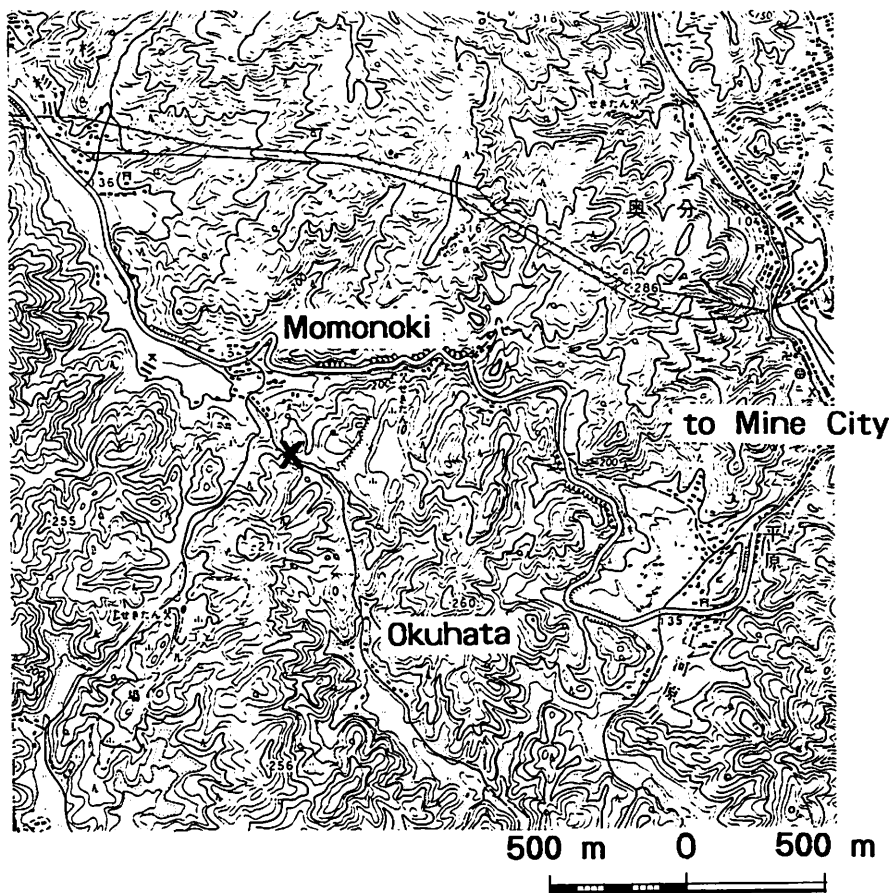


Fig. 1. A map showing the locality (X) for the fossil insect from the Momonoki Formation at Okuhata, Mine City in Yamaguchi Prefecture.

Description

Family Orthophlebiidae

Genus *Orthophlebia* WESTWOOD

***Orthophlebia haradai* sp. nov.**

(Plate 1, Fig. 2)

Japanese name: Harada-mukashi-shiriage

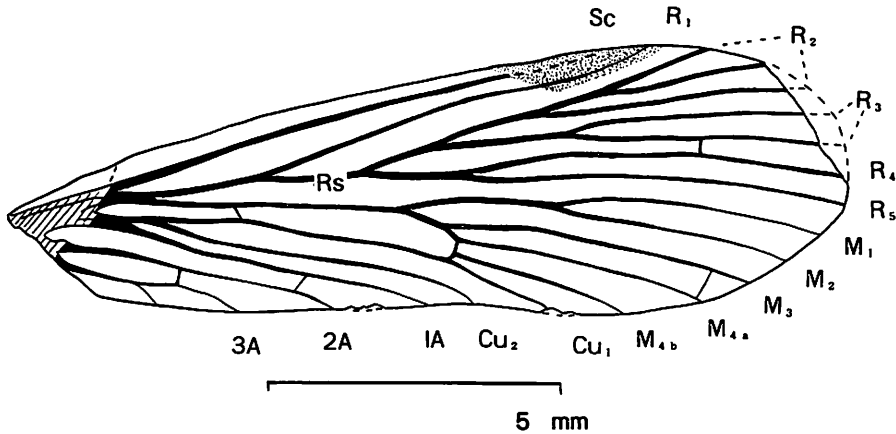


Fig. 2. *Orthophlebia haradai* UEDA, sp. nov. Counterpart of forewing. Length 14 mm.

Material. Left fore wing, missing the basal portion, with counterpart slightly lacking the apical portion; total length 14 mm, greatest width 5 mm.

Fore wing without any colour-pattern. Humeral veinlet present near wing base, but very faintly indicated. Sc long, straight without a short veinlet and ending in costa near the middle of pterostigma. R_1 at the origin of Rs is about 1.5 times as far from Sc as Sc is from costa, and converging towards Sc near pterostigma; pterostigma well developed and its posterior margin running between R_1 and R_2 . Rs with seven branches; R_2 3-branched, R_3 2-branched; stalk of R_4 and R_5 , stem of R_3 and all branches of R_2 all pectinate; the fork of R_3 is longer than the stalk; cross vein present between posterior fork of R_3 and R_4 .

M dividing about middle of wing, with five branches; a cross vein present between M_3 and M_{4a} near wing margin; M_5 present at about 1/3 between M base and its primary fork. Cu_1 arched from its origin, then slightly waved to mcu ; Cu_2 almost straight and slightly diverging distally from Cu_1 . IA slightly waved and almost straight beyond the middle; 2A sub-parallel to IA but diverging distally from it; a middle cross vein present between 2A and 3A; 3A with a short basal branch and waved.

Holotype: Left forewing (KMNH IP 000,002).

Locality : Okuhata, Mine City, Yamaguchi Pref., Honshu, Japan.

Momonoki Formation, Mine Group. Carnian, Upper Triassic.

Remarks. This fossil insect has radial sector with seven pectinate branches and its forewing is 14 mm in length. The branching point of R_2 and R_3 is present slightly basad than that of R_4 and R_5 . Moreover the branching patterns of M (5-branched), Cu and A, and the presence of pterostigma clearly indicate that this species belongs to the genus *Orthophlebia* WESTWOOD, 1845.

Judging from the fossil records, the genus *Orthophlebia* is inferred to have been rich in species, and rather common from Upper Trias to Upper Lias in the Northern Hemisphere (WESTWOOD, 1845; BODE, 1905, 1953; HANDLIRSCH, 1906, 1939; MARTYNOV, 1925, 1927, 1937; TILLYARD, 1933; MARTYNOVA, 1948 etc.). WILLMANN (1978) carefully examined these species and summarized them into 44 species under the genus *Orthophlebia* including doubtful and unnamed species. HONG (1985) recorded *Protorthophlebia yaogouensis* HONG from the Middle Jurassic of Yuxian county. This species has six-branched Rs and it may be assigned to the genus *Orthophlebia*. SUKATCHEVA (1985) described seven new species of the genus *Orthophlebia* from the Jurassic of Siberia and Mongol; *O. lauta*, *O. retorrída*, *O. latebrosa*, *O. mongolica*, *O. martynovae*, *O. obunca* and *O. jejuna*. Therefore 52 species of the genus *Orthophlebia* have been described from the Northern Hemisphere. The present new species *haradai* is one of the oldest record of this genus and clearly distinguished from most of the known species by the two-branched R_3 in the forewing. The same character-state of R_3 is found in the hindwing of *O. gigantea* TILLYARD and in the forewing of *O. bella* HANDLIRSCH, but the former has an additional branch of R_2 (four-branched R_2) and the size is larger than *haradai*, and the latter also has an additional branch of R_2 and the fork of R_3 is shorter than the stalk.

The species name is dedicated to Mr. Takayoshi HARADA for his kind arrangement to Kitakyushu Museum of Natural History on the donation of this specimen.

Reference

- AIZAWA, J., 1991. Fossil insect-bearing strata of the Triassic Mine Group, Yamaguchi Prefecture. *Bull. Kitakyushu Mus. Nat. Hist.*, **10**: 91-98, figs. 1-4, pls. 1-2.
- BODE, A., 1905. Orthoptera und Neuroptera aus dem Oberen Lias von Braunschweig. *Lb. k. Preuss. Geol. L.-A. Bergakad.* (1904): 218-245.
- 1953. Die Insektenfauna des Ostniedersächsischen Oberen Lias. *Palaeontographica*, **103**(A): 1-375.
- FUJIYAMA, I., 1973. Mesozoic insect fauna of East Asia. Part I. Introduction and Upper Triassic fauna. *Bull. Natn. Sci. Mus. Tokyo* **16**(2): 331-386, 5 pls.
- HANDLIRSCH, A., 1906-08. *Die fossilen Insekten und die Phylogenie der rezenten Formen*. 1430 pp., 51 pls.
- 1920. Kapitel 7, Palaeontologie, V. Die Mesozoische Fauna, in SCHRÖDER, *Handb. Entom.*, **III**: 175-214.
- 1939. Neue Untersuchungen über die fossilen Insekten, mit Ergänzungen und Nachträgen sowie Ausblicken auf phylogenetische, palaeogeographische und allgemein biologische Probleme. 2 Teil. *Ann. Naturhist. Mus. Wien* **49**(1938): 1-240. Wien.
- HENNIG, W., 1981. *Insect phylogeny*. 514 pp. John Wiley & Sons.
- HONG, Y., 1985. New fossil insects of Xiahuayuan Formation in Yuxian county, Hebei province. *Bull. Tianjin Inst. Geol. Min. Res.* **13**: 131-138.
- MARTYNOV, A., 1925. To the knowledge of fossil insects from Jurassic beds in Turkestan. Hymenoptera, Mecoptera. *Изв. АН СССР* No. 19, CTP: 753-762.
- 1927. Jurassic fossil Mecoptera and Paratrachoptera from Turkestan and Ust-Balei (Siberia). *Bull. Acad. Leningrad*, (vi)XXI: 651-666.

- Blattodea and Coleoptera. *Trav. Inst. Paléont. Acad. Sci. URSS* 7, 1: 3-180.
- Мартынова, О. М., 1948. Индивидуальная изменчивость крыльев Mecoptera. *Изв. АН СССР*, No. 2, СТР: 193-198.
- 1948. Материалы по эволюции Mecoptera. *Тр. Палеонтол. ин-та, АН СССР*; Т.14, Вып. 1, СТР: 1-76.
- SCHLEE, H. B. & SCHLEE, D., 1976. Bibliographie der rezenten und fossilen Mecoptera. *Stuttg. Beitr. Naturk. (A)*, 282: 1-76.
- SUKATCHEVA, I., 1985. Jurskije skorpionnizy jushnoi sibiri i sapadnoi monogolii. *Trudy Paleontologicheskogo Instituta Akademii Nauk SSSR* 211: 96-114.
- TILLYARD, R. J., 1933. The panorpoid complex in the British Rhaetic and Lias. *British Museum (Nat. Hist.) Fossil insects*, No. 3. 79 pp.
- WILLMANN, R., 1978. Mecoptera (Insecta, Holometabola). *Fossilium Catalogus, Animalia*, 124: 1-139, The Hague.
- 1987. The phylogenic system of the Mecoptera. *Syst. Ent.* 12: 519-524.

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Plate 1

Explanation of Plate 1

Fig. 1. *Orthophlebia haradai* UEDA, sp. nov. Holotype, forewing, KMNH
IP 000,002.

Fig. 2. Ditto, counterpart of holotype.

